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Research Article

**STROKE, A FOREMOST CAUSE FOR DISABILITY AND
FUNCTIONAL IMPAIRMENT**¹Mudasir Maqbool, ²Dr Ubaid ur Rehman Toor, ³Dr. Sabreen Fatima Nahra¹Department of Pharmaceutical Sciences, University of Kashmir, ²King Edward Medical University, ³House Officer DHQ Teaching Hospital Gujranwala.**Article Received:** December 2018 **Accepted:** February 2019 **Published:** March 2019**Abstract:**

Stroke is a devastating and life altering incident which influence not just the individual with stroke, but also family members and caretakers. Stroke is a worldwide medical issue and is the 2nd familiar reason for demise and 4th important reason for handicap around the world. Roughly 20 million individuals get stroke every year and out of this, 5 million won't stay alive. In advanced nations, the most important reason for disability is stroke, second foremost reason for dementia and third important reason for death. Most commonly seen life threatening adverse events associated with stroke are Infections such as pneumonia and urinary tract infection; depression, fall and fracture. Immobility related complications are pressure ulcers, deep vein thrombosis, limb muscle contractures, shoulder pain, constipation and medical complications such as intracerebral bleed, another stroke and seizures. Advanced age and severity of stroke is the most common cause of greater length of stay in hospital following acute stroke. Further bed rest or immobility related adverse events may delay early discharge from the hospital. Research evidence says that very early, frequent and intensive mobilization activities including out of bed activities help in reducing the length of the hospital stay. In this paper, we will briefly review various aspects related to stroke.

Key words: Stroke, cerebral injury, seizures**Corresponding author:****Mudasir Maqbool,**

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INTRODUCTION:

Stroke is a devastating and life altering incident which influence not just the individual with stroke, but also family members and caretakers. Stroke is a worldwide medical issue and is the 2nd familiar reason for demise and 4th important reason for handicap around the world [1]. Roughly 20 million individuals get stroke every year and out of this, 5 million won't stay alive [2]. In advanced nations, the most important reason for disability is stroke, second foremost reason for dementia and third important reason for death. Stroke is a main source of functional impairment with 20% of people who live need hospital care after 3 months and 15% - 30% are disabled eternally [3]. The World Health Organization (WHO) characterizes "stroke as the rapid development of clinical signs and symptoms of a focal neurological disturbance lasting more than 24

hours or leading to death with no apparent cause other than vascular origin"[4]. Stroke impact rely upon the location and seriousness of damage. An exceptionally serious stroke can bring about sudden demise. The most widely recognized manifestations of a stroke are immediate weakness or lack of sensation of the face, arm or leg, usually on one side of the body. Additional problems consist of: trouble in talking or understanding speech, confusion, trouble in vision in one or both eyes, giddiness, balance or coordination problems and walking difficulty [5, 6]. In 2013, American Stroke Association updated definition of stroke as "an acute episode of focal dysfunction of the brain, retina, or spinal cord lasting longer than 24 hour, or of any duration if imaging (CT or MRI) or autopsy show focal infarction or hemorrhage relevant to the symptoms" [7]

American Heart Association/American Stroke Association recommended selection criteria for mechanical thrombectomy in acute ischemic stroke

Functionally independent pre-stroke (mRS score of 0 to 1)
 Acute ischemic stroke receiving intravenous t-TPA within
 4.5 hours of onset
 Stroke caused by occlusion of the internal carotid artery or
 proximal (M1) middle cerebral artery on imaging
 (CT angiography)
 Age \geq 18 years old
 NIHSS score of \geq 6
 CT brain without evidence of large infarct (ASPECTS score \geq 6)
 Treatment is able to be initiated (groin puncture) within 6 hours
 of symptom onset

AHA/ASA selection criteria for mechanical thrombectomy in acute ischemic stroke [8, 9]

Epidemiology:

Stroke is a universal health problem. It is the primary reason of death, serious long-standing disability and disease burden in both high economy as well as low and middle economy countries [10, 11]. The World Health Organization (WHO) pointed out that, globally brain attack causes 6.7 million deaths per year [11]. Just about 75% of the cerebrovascular

accidents occur >65 years aged people, although brain-stroke may affect by any given age [12]. Worldwide, 16 million new cases of acute stroke occur every year, stroke causes death in about three million women and two and half million men every calendar year [12, 13] Cerebrovascular accident is the 2nd most important reason of mortality over sixty years and 5thmost important reason in people aged

15 to 59 years old. 12.6 million have moderate to severe disability after stroke [14-16] The disability adjusted life year (DALY) is “a measure of overall disease burden, expressed as the number of years lost due to ill health, disability or premature death” [17]. The WHO predicts that, the disability adjusted life years (DALYs) missing due to stroke will increase from 38 million in 1990 to 61 million in 2020 [12].

Stroke is the 1st and foremost cause for disability and is a main reason of impairment in functional abilities with 20% of stroke needing institution care after 3 months and 15-30% disabled forever [10]. “In 2004, the Indian Council of Medical Research(ICMR) in India estimated that stroke approximated to 41% of demise and 72% of disability adjusted life years in the midst of non communicable disease”[18]. The Macroeconomic and health committee in India predicted that there will be increase in number of stroke patients from 1,081,480 in 2000 to 1,667,372 in 2015 [19].

In India, stroke prevalence in young people is high (18%-32% of total stroke patients) in comparison with high-income countries [20]. Prevalence of stroke among the old age in urban was 1.9% and in rural India was 1.1%. The common age of stroke clients in budding countries is 15years younger than that in developed countries [21]. Research from India has revealed about 10% to 15% strokes take place among individual less than 40 years [22]. In India, almost one-fifth of patients with first ever stroke hospitalized are aged <40 years [23]. Compared to other developed countries higher percentage of younger people are affected in India. Ischemic stroke is the most familiar other than hemorrhagic and embolic stroke and twenty one to forty eight percentage of stroke in younger people is caused due to atherosclerotic big artery obstructive illness [6]. “Temporary analysis of 3,092 subjects in a research carried in India revealed that roughly 27% (814) of the stroke clients were under the age of 50 and 30% (935) of clients were from lower income group.

Therefore, making it evident that stroke incidence is high amongst young people and as well as amid poor people in India [24]. This coincides with previous evidence of incidence and prevalence of stroke was higher among slum dwellers in Kolkata than in non-slum dwellers, but the difference was not statistically significant [25]. It is found prevalence of risk factors like hypertension and hypercholesterolemia were 7% and 10% higher respectively among the low-income urban population of Chennai compared with the middle-income population”[21]. Men get stroke than women, the female/male sex ratio for India is 1:7 [26]. This might be due of variations in risk factors such as drinking and smoking that are common amid men in India in comparison with women [27]. The mean age of beginning of stroke for men in India varies from 63-65 for men and 57-68 for women [28, 20, 29].

Risk factors:

Several risk factors have been associated with stroke. They are classified into two groups such as risk factors that can be modified and fixed risk factors. Modifiable risk factors that can be altered with correcting life style include high blood pressure, type 2 diabetes mellitus, chronic smoking, associated cardiac disease (coronary artery disease, atrial fibrillation), hyperlipidemia (elevated lipids), excessive cholesterol markers, excessive consumption of alcohol, fatness, poor diet in aged population, lack of physical activity, increase in red blood cells, use of contraceptive pills, stress, blood clotting abnormalities, social isolation.[30, 31, 32]. Risk factors that are fixed include advance age (>65 years), sex (male>female), race (Afro Americans), family or individual history of previous stroke or transient ischemic attack, malformations in the veins or arteries in the cerebrum, hereditary conditions, for instance sickle-cell anaemia, haemophilia, hereditary cardiac disease [30, 33, 34].

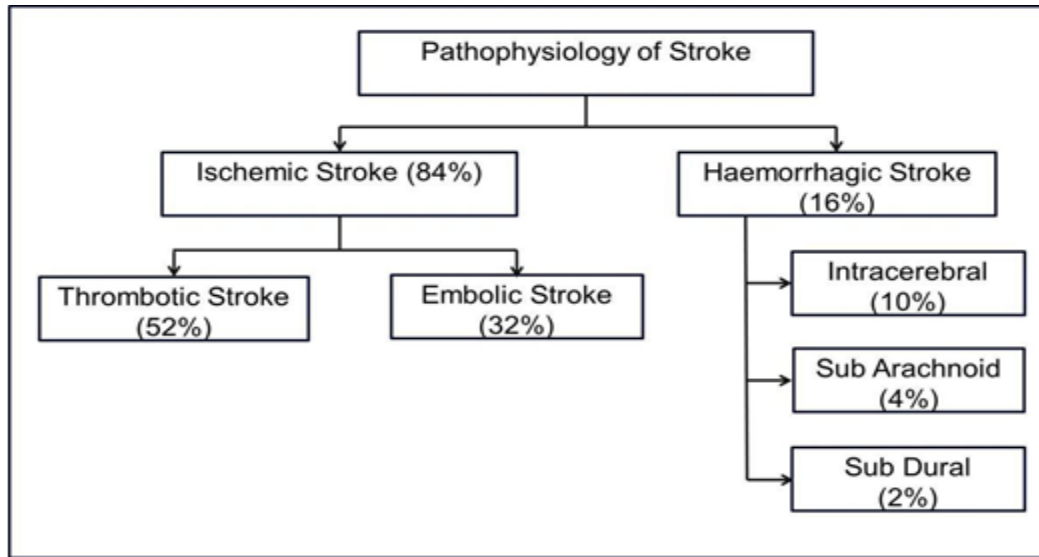


Figure1: Pathophysiology of stroke [35].

Comparison of ischemic syndromes of the brain and heart

Characteristic	Acute ischemic stroke syndromes	Acute coronary syndromes
Pathophysiology	Heterogeneous: cardioembolic, artery-to-artery embolization, small-vessel disease, cryptogenic or embolic stroke of undetermined source (also known as ESUS)	Homogeneous: rupture of plaque and in situ formation of occlusive thrombus (most cases)
Diagnosis	Clinical; imaging is mandatory and used for treatment decisions	Clinical assessment, electrocardiography and imaging used for risk stratification and prognostication
Thrombolytics	Alteplase (tPA) is standard; other thrombolytic agents still under investigation	Tenecteplase is standard; alteplase (tPA), reteplase and streptokinase are alternative proven therapies
Endovascular therapy	Endovascular thrombectomy proven for patients selected by imaging and with fast treatment paradigms	Primary percutaneous coronary intervention established for STEMI, within 12 h of symptom onset
Organized care units or wards	Associated with proven improvement in mortality and morbidity, but not yet widely established throughout Canada	Shown to improve mortality and morbidity; well established worldwide
Milder clinical syndromes	TIA and minor stroke require same-day assessment, diagnosis and management to prevent major acute stroke	Unstable angina and NSTEMI require urgent assessment, diagnosis, risk stratification and often invasive management to prevent major cardiovascular events

Note: NSTEMI = non-ST-elevation myocardial infarction, STEMI = ST-elevation myocardial infarction, TIA = transient ischemic attack, tPA = tissue plasminogen activator.

Comparison of ischemic syndromes of the brain and heart [36]

Consequences of bed rest/immobility/lack of physical activity in the hospital following stroke:

Bed rest after the stroke may delay in recovery and have a harmful effect on the heart, lung, gastrointestinal, musculoskeletal and nervous system. Furthermore bed rest also causes development of serious medical conditions such as, DVT, lung infection-pneumonia, urinary tract infection, pressure ulcers, falls, fractures, abnormal mood and dependency in daily living activities. Furthermore

lack of physical activity during the hospital stay may cause atrophy of muscle, reduction in muscle power, reduced bone mineral density, maximal oxygen consumption, and postural hypotension. Half of deaths happened in the first four weeks after cerebrovascular accident may be due to the bed rest. There is strong evidence that bed rest is dangerous, delay recovery, and prolongs length of the hospital stay in most of the clinical conditions [18, 19].

Complications associated with stroke:

Most commonly seen life threatening adverse events associated with stroke are Infections such as pneumonia and urinary tract infection; depression, fall and fracture. Immobility related complications are pressure ulcers, deep vein thrombosis, limb muscle contractures, shoulder pain, constipation and medical complications such as intracerebral bleed, another stroke and seizures [37-44].

Pneumonia: It is most frequently seen respiratory complication associated with stroke. Pneumonia causes difficulty in breathing, if untreated it may cause atelectasis and respiratory failure. Individuals with post stroke dysphasia frequently report aspirated pneumonia. Incidence of pneumonia in acute stroke is around 10% [45].

Urinary Tract Infection (UTI):

It is a recognized serious adverse event of cerebrovascular accident. It can occur as a result of immobility, urinary catheter and advanced age. Incidence of UTI following stroke is around 10% [45].

Falls:

Following stroke falls are regularly seen adverse event. It may cause fractures and further affects freedom in activities of daily living and fall is associated with poor trunk control and balance, severity and advanced age. Approximately half of the individuals with stroke experience fall [46, 47].

Pressure ulcers:

The most commonly seen adverse effect of bed rest after stroke is pressure ulcers. Immobility or decreased movements may cause continuous pressure, friction, shear forces on underlying tissues results pressure sores. Frequency of pressure sore following stroke is around 17% [47].

Deep venous thrombosis (DVT):

Deep vein thrombosis is the life threatening medical complication, routinely seen in acute cerebrovascular accident survivors. In general, prevalence of DVT after stroke is around 2-20% [43]. CLOTS trial reported that 11% of stroke subjects experienced DVT [48]. Blood clots form in veins of the legs because of immobilization following stroke. Pulmonary embolism results if DVT is formed and dislodged to land in pulmonary circulation. Conventionally stroke survivors who developed DVT were medically managed using low molecular weight heparin, compression therapy and strict bed rest [48-50]. However recent research suggests that early

mobilisation including ambulation may prevent deep vein thrombosis and pulmonary embolism [49, 50].

Muscle contractures:

Muscle contractures are frequently seen immobility related complication of post acute stroke. Contracture is an adaptive shortening of the muscle due to abnormal position of limbs in bed, wheel chair and lack of movement. 43% of individuals with stroke develop contractures in limb muscles due to bed rest. Contractures were estimated as one third of the restriction in range of motion of the joint [47].

Shoulder pain:

Impingement of shoulder joint occurs, when an individual with stroke positioned on affected side. Weakness, spasticity may pull the shoulder joint inferiorly may also cause shoulder pain. Support should be provided while transfer, positioning and mobilisation of the stroke survivor. Approximately 39% of stroke survivors complain shoulder pain [47, 51].

Constipation:

Constipation is most commonly reported an immobility related complication in acute stroke survivors. Constipation disturbs mood, discomfort and uneasiness complained during physiotherapy and addressed with medical intervention and high fiber diet. Physiotherapist uses early mobilisation including standing therapy to address this issue [52].

Emergency medical management of stroke:

An ischemic stroke survivor, if admitted within three hours of stroke onset, thrombolytic drug, intravenous tissue plasminogen activator (Rt-PA) is administered to reduce catastrophic events like death and permanent disability following stroke [53-56]. Anticoagulants, [56] Anti platelet drug such as aspirin given to save the patient's life [57-59].

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